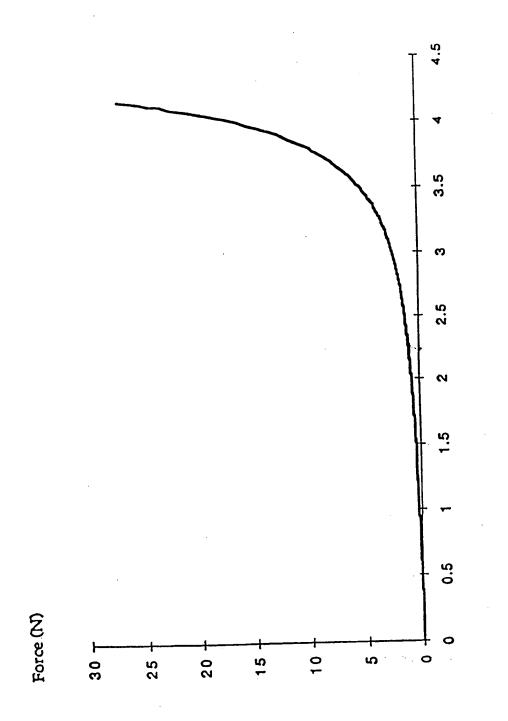
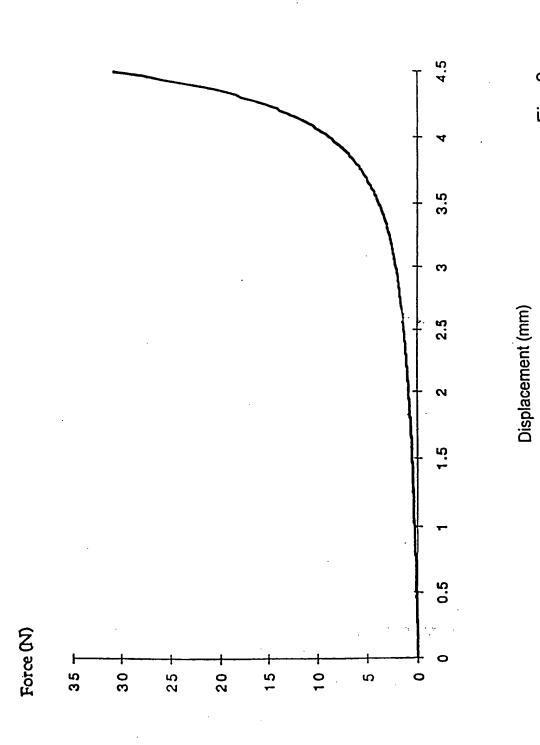
Compression of 5 mm disk (5 mm diameter) at 2 mm/min



Displacement (mm)

Compression of 5 mm disk (5 mm diameter) at 2 mm/min



Diamine

Fig. 3a

Triamine

Fig. 3b

SG-PEG: Tetrafunctionally Activated PEG Succinimidyl Glutarate

I,CH ₂ O),-CH ₂ CH ₂ -O-(CH ₂ CH ₂ O),-CO-(CH ₃),-CO-O-N(COCH ₁), CH ₃ -CH ₂ -C-CH ₂ -C-CH ₂ CH, / / \ / CH ₂ O),-CH ₂ CH ₂ -O-(CH ₂ CH ₂ O),-CO-(CH ₃),-CO-O-N(COCH ₃),	Multi-amino PEG	→	CH ₂ O),-CH ₂ CH ₂ -O-(CH ₃ CH ₂ O),-CO-(CH ₂);-CO-NH-PEG^^^ \ / / CH ₃ -CH ₂ -C-CH ₂ -C-CH ₂ CH ₃	\ CH ₂ -O(CH ₂ CH ₂ O),-CO-(CH ₂),CO-NH-PEG^^^
(COCH ₂) ₂ N-O-CO-(CH ₂) ₃ -CO-O-(CH ₂ CH ₂ O),-CH ₂ (COCH ₃) ₂ N-O-CO-(CH ₂) ₃ -CO-O-(CH ₂ CH ₂ O),-CH ₂	+		***PEG-HN-CO-(CH ₂) ₃ -CO-O-(CH ₂ CH ₂ O),-CH ₂	/ /***********************************

SE-PEG, m=3: Tetrafunctionally Activated PEG Succinimidyl Butylate (Ether Linkage)

CH2-O-(CH2CH2O),-(CH2),-CO-O-N(COCH2), СН3-СН2-С-СН7-О-СН2-С-СН2СН3 (COCH₂)₂N-O-CO-(CH₂)₃-O-(CH₂CH₂O),-CH₃

CH₂-O-(CH₂CH₂O),-(CH₂),-CO-O-N(COCH₃), (COCH₃)₂N-O-CO-(CH₂)₃-O-(CH₂CH₂O)_n-CH₂

Multi-amino PEG

^^^PEG-HN-CO-(CH₂)₃-O-(CH₂CH₂O),-CH₂

CH₂-O-(CH₂CH₂O),-(CH₂),-CO-NH-PEG^^^

сн,-сн,-с-сн,-о-сн,-с-сн,сн,

^^^PEG-HN-CO-(CH2),-O-(CH2CH2O),-CH2

CH2-O(CH2CH2O),-(CH2),CO-NH-PEG^^^

SE-PEG, m=2 Tetrafunctionally Activated PEG Succinimidyl Butylate (Ether Linkage)

CH₂-O-(CH₂CH₂O),-(CH₂),-CO-O-N(COCH₁), CH₂-O-(CH₂CH₂O),-(CH₂)₂-CO-O-N(COCH₂), CH3-CH2-C-CH2-O-CH2-C-CH2CH3 (COCH₁)₁N-O-CO-(CH₂)₂-O-(CH₂CH₂O)₁-CH₂ (COCH₁)₂N-O-CO-(CH₂)₂-O-(CH₂CH₂O)₄-CH₂

Multi-amino PEG

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^^^PEG-HN-CO-(CH₂)₂-O-(CH₂CH₂O),-CH₂

CH2-O-(CH2CH2O),-(CH3),-CO-NH-PEG^^^ СН,-СН,-С-СН,-О-СН,-С-СН,СН,

^^^PEG-HN-CO-(CH₂)₂-O-(CH₂CH₂O)_n-CH₂

CH2-O(CH2CH2O),-(CH2)2CO-NH-PEG^

SE-PEG, m=1 Tetrafunctionally Activated PEG Succinimidyl Acetate (Ether Linkage)

CH₂-O-(CH₂CH₂O)_n-CH₂-CO-O-N(COCH₂)₂ CH₂-O-(CH₂CH₂O),-CH₂-CO-O-N(COCH₁), CH3-CH2-C-CH2-O-CH2-C-CH3CH3 (COCH₁),N-O-CO-CH₂-O-(CH₂CH₂O),-CH₂ (COCH₁)₁N-O-CO-CH₁-O-(CH₂CH₂O)₁-CH₂

Multi-amino PEG

 \rightarrow

^^^PEG-HN-CO-CH₂-O-(CH₂CH₂O),-CH₂

СН,-СН,-С-СН,-О-СН,-С-СН,СН,

CH2-0-(CH2CH2O),-CH2-CO-NH-PEG^^^

^^^PEG-HN-CO-CH₂-O-(CH₂CH₂O),-CH₂

CH2-O(CH2CH2O),-CH2CO-NH-PEG^^^

CH₂-0-(CH₂CH₂0),-NH-CO-(CH₂)₂-CO-NH-PEG^^^

^^^PEG-HN-CO--(CH₃)₂-CO-NH-O-(CH₂CH₂O)₆-CH₂

SSA-PEG, m=2: Tetrafunctionally Activated PEG Succinimidyl Succinamide

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4,CH ₂ O),-CH ₂ CH ₃ -O-(CH ₂ CH ₂ O),-NH-CO-(CH ₃) ₂ -CO-O-N(COCH ₂) ₃ CH ₃ -CH ₂ -C-CH ₂ -O-CH ₃ -CH ₃ / / / / / / CH ₂ -CH ₂ O),-CH ₂ CH ₂ -O-(CH ₂ CH ₂ O),-NH-CO-(CH ₂) ₃ -CO-O-N(COCH ₃) ₃	Multi-amino PEG ↓ CH₂-O-(CH₂CH₁O),-NH-CO-(CH₁),-CO-NH-PEG^^^	/ CH ₃ -CH ₂ -C-CH ₁ -C-CH ₂ CH ₃
(COCH ₂) ₁ N-O-CO-(CH ₂) ₂ -CO-NH-O-(CH ₂ CH ₂ O) _n -CH ₂ CH ₃ -C-CH (COCH ₃) ₁ N-O-CO-(CH ₂) ₂ -CO-NH-O-(CH ₂ CH ₂ O) _n -CH ₂	+ ************************************	CH ₃ -CH ₂ -C-C

SC-PEG, m=0: Tetrafunctionally Activated PEG Succinimidyl Carbonate

CH₂-O-(CH₂CH₂O),-CO-O-N(COCH₂), CH₂-O-(CH₂CH₂O),-CO-O-N(COCH₂)₁ CH,-CH,-C-CH,-O-CH,-C-CH,CH, (COCH₃)₃N-O-CO-O-(CH₂CH₂O)₄-CH₃ (COCH₂),N-O-CO-O-(CH₂CH₂O),-CH₂

→

Multi-amino PEG

^^^PEG-HN-CO-O-(CH₂CH₂O),-CH₂

CH2-O-(CH2CH2O),-CO-NH-PEG^^^

A-PEG: Tetrafunctionally Activated PEG Propion Aldehyde

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СН3-0-(СН3СН3О),-СН3 СН3-СНО СН₂-0-(СН₂СН₂0),-СН₂СН₂-СНО СН,-СН,-С-СН,-О-СН,-С-СН,СН, СНО-СН, СН,-О-(СН,СН,О),-СН, CHO-CH2CH2-O-(CH2CH2O),-CH2

+ Multi-amino PEG

^^^PEG-NH-CH, -CH, CH₂-O-(CH₂CH₂O),-CH₂

***PEG-NH-CH,-CH,CH,-O-(CH,CH,O),-CH,

1, CH2-O-(CH2CH3O),-CH2-CH2-CO-NH-PEG^^

CH₂-O-(CH₂CH₂O),-CH₂-CH(OH)CH₂-NH-PEG^^^

***PEG-NH-CH1 (OH)CH-CH1-O-(CH2CH1O),-CH1

E-PEG: Tetrafunctionally Activated PEG Glycidyl Ether

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:H ₂ O),-CH ₂ CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂ -CH-O-CH, \	\ CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂ -CH-O-CH ₂	Multi-amino PEG	→	H,CH,O),-CH, CH,-O-(CH,CH,O),-CH,-CH(OH)CH,-NH-PEG^^^ CH,-CH,-C-CH,-C-CH,CH,
CH ₂ -O-CH-CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂	/ CH ₂ -O-CH-CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂	+		^^^PEG-NH-CH, (OH)CH-CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂

I-PEG: Tetrafunctionally Activated PEG Isocyanate

CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂ CH ₂ -N=C=O / .c-CH ₂ CH,	\ CH ₂ -O-(CH ₂ CH ₂ O) _n -CH ₂ CH ₂ -N=C=O	Multi-amino PEG	· →	CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂ -NH-CO-NH-PEG^^^ /	CH ₃ -C-CH ₂ -C-CH ₂ -C-CH ₃ CH ₃	\ CH2-O-(CH2CH2O),-CH2-NH-CO-NH-PEG^^^
O=C=N-CH ₂ CH ₂ -O-(CH ₂ CH ₂ O), CH ₂ CH ₂ -O-(CH ₂ O-(CH ₂ CH ₂ C-CH ₂ -C-CH ₂ -C-C-CH ₂ -C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C	/ O=C=N-CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂	+		^^^PEG-NH-CO-NH-CH ₂ -O-(CH ₂ CH ₂ O),-CH ₂	CH3-CH3-C-C	/ /*** / VEG-NH-CO-NH-CH ₂ -O-(CH ₂ CH ₂ O), -CH ₂

V-PEG: Tetrafunctionally Activated PEG Vinylsulfone

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CH₂O-O-(CH₂CH₂O), -SO₂-CH₂CH₂-NH-PEG^^^ CH₂O-O-(CH₂CH₂O), -SO₂-CH₂CH₂-NH-PEG^^^ CH2.0-(CH2CH20),-SO2-CH-CH3 CH2.0-(CH2CH20),-SO1-CH=CH2 Multi-amino PEG сн,-сн,-с-сн,-о-сн,-с-сн,сн, сн,-сн,-с-сн,-о-сн,-с-сн,сн, + ^^^PEG-NH-CH1CH1-SO1-O-(CH1CH1O),-CH1 ^^^PEG-NH-CH1CH1-SO1-O-(CH1CH1O),-CH1 CH,=CH-SO,-O-(CH2CH2O),-CH2 CH₁=CH-SO₁-O-(CH₂CH₂O),-CH₂

Disuccinimidyl Suberate (DSS)

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PEG-HN-CO-CH₂-CH₂-CH₂-CH₂-CH₂-CO-NH-PEG

Dithiobis(succinimidylpropionate) (DSP)

 $\mathsf{PEG}\text{-}\mathsf{HN}\text{-}\mathsf{CO}\text{-}\mathsf{CH}_2\text{-}\mathsf{CH}_2\text{-}\mathsf{S}\text{-}\mathsf{S}\text{-}\mathsf{CH}_2\text{-}\mathsf{CO}\text{-}\mathsf{NH}\text{-}\mathsf{PEG}$

Bis(sulfosuccinimidyl) Suberate (BS³)

PEG-HN-CO-CH₂-CH₂-CH₂-CH₂-CH₂-CH₂-CO-NH-PEG

Bis(2-succinimidooxycarbonyloxy)ethyl Sulfone (BSOCOES)

PEG-HN-CO-O-CH₂-CH₂-SO₂-CH₂-CH₂-O-CO-NH-PEG

3,3'-Dithiobis(sulfosuccinimidyl-propionate) (DTSSP)

PEG-HN-CO-CH₂-CH₂-S-S-CH₂-CH₂-CO-NH-PEG